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NOISE TECHNICAL REPORT

Support Document for the

Draft Environmental Impact Statement

Anaconda Nevada Moly Project

Lead Agency
U.S. Department of the Interior
Bureau of Land Management
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CHAPTER 1

ALTERNATIVES INCLUDING THE PROPOSED ACTION

(Refer to the Draft Environmental Impact Statement)

CHAPTER 2

AFFECTED ENVIRONMENT

INTRODUCTION

To adequately describe the environment potentially affected by noise emissions due to the proposed project, noise sensitive receptors, noise sources, special terrain features, and noise levels must be identified.

REGIONAL OVERVIEW

Noise Sensitive Receptors

Noise sensitive receptors are areas or land uses in which people or wildlife could be adversely affected by project produced environmental noise. The project elements are located in a sparsely populated (occasional ranches) semi-arid region in the central portion of Nevada. The mine/mill complex is located approximately 18 miles northwest of the city of Tonopah, Nevada. There are no residences within an approximate 10 mile radius of the mine/mill complex. The proposed transmission line would be entirely on public lands and with the nearest residence located at a distance of over 1 mile from the right of way (ROW). Noise sensitive wildlife species are limited primarily to a variety of raptors which nest primarily in the mountain ranges but use the valley areas as hunting grounds. A more detailed identification of wildlife species is contained in the Wildlife Technical Report.

Noise Sources

The only sources of manmade noise now affecting the project area are (1) exploratory drilling operations, (2) occasional off-road vehicles, and (3) occasional light aircraft overflights. The project site and environs do not presently contain significant sources of manmade noise. Natural sources of noise consist principally of wind blowing through grass and brush.

Terrain Features

The mine/mill complex is located on the western portion of the San Antonio Mountain Range. To the east are a series of hills and valleys, with essentially no human habitation. To the west is a vast, flat expanse, the Big Smokey Valley, representing an ancient lake bed. The proposed transmission line runs through this latter region in a northerly direction, tieing in with an existing line near Austin, Nevada.

Existing Noise Levels

Due to the remoteness of the project from manmade sources of noise, and the existence of measured data for similar remote areas, it was determined that a field measurement program to measure existing noise was not necessary.

Table 2-1 compares measured remote area noise data in several references. Basically these data show that in natural environments, noise levels can be extremely low, on the order of 15 dBA and vary over a considerable range up to levels of approximately 45 dBA, depending upon what sources are present.

SUMMARY

The affected environment can be described in terms of noise sensitive receptors, noise sources, terrain features, and existing noise levels. There are no wildlife or human land use areas capable of being disturbed by manmade noise within 10 miles of the mine/mill complex or within 1 mile of the transmission line. Manmade noise sources consist of occasional off-road vehicles and aircraft as well

TABLE 2-1

EXAMPLES OF REMOTE AREA MEASURED NOISE LEVELS

	Daytime+					Nighttime+				
		Levels					Levels			
Location/Season	Sources	L_{90}	L_{50}	L_{10}	L_{eq}	Sources	L_{90}	L_{50}	L_{10}	L_{eq}
North rim of the Grand Canyon (100 miles from St. George, Utah)**	Birds, chipmunks	16	20	30	40	Crickets	21	26	33	32
Remote area in New Mexico**	No distinct sources present	16	17	17	16	No distinct sources present	14	15	16	15
Remote area (Hoyt Lakes, Minnesota)**	Birds, frogs, wind in leaves	38	41	46	44	Wind in leaves, distant dogs	30	31	34	38

+Noise Level statistics in dBA; refer to Glossary for definition of terms.
*USEPA 1971a)
**ERT private client files.

as exploratory drilling operations. The terrain is essentially flat to the west and mountainous to the east of the mine/mill complex. The transmission line runs north through flat terrain. Existing noise levels are estimated to be in the range of 15 to 45 dBA depending on the sources of noise present at the time.

CHAPTER 3

ENVIRONMENTAL CONSEQUENCES

EVALUATION CRITERIA AND ASSUMPTIONS

Noise Impact Criteria

Noise impact is judged according to two criteria: (1) the extent that specific, quantitative government laws or regulations are exceeded, and (2) the estimated extent that people (or wildlife) will be actually adversely affected.

There are no federal, State of Nevada, or local regulations that apply directly to the community noise resulting from this project. The U.S. EPA has established guidelines for noise levels requisite for the protection of public health and welfare. According to the EPA guidelines (EPA 1974), long-term day/night (L_{dn}) equivalent outdoor levels below 55 dBA will not degrade public health and welfare: the 55 dBA value includes a conservative allowance to provide for an "...adequate margin of safety..."

At local levels of government, specific, quantitative noise regulations are not common. Typically, noise regulations at the county or municipal level of government prohibit "unnecessary" noise, or any noise that creates a "nuisance."

The extent of noise impact on human receptors from a proposed project is proportional to a number of interrelated factors: the change in noise level, the presence of existing, non-project noise sources, peoples' attitude concerning the project (Stevens, Rosenblith, and Bolt 1955), the number of people exposed, the type of human activity (sleep, recreation, conversation) affected. For wildlife, similar factors are believed to be significant in determining the degree of noise impact produced (EPA 1974).

Assumptions

The proposed project is of a scale and at design stage such that many details in terms of specific types and quantities of equipment are not available. However, sufficient information was available regarding the general nature of the mine/mill operation to allow for making conservative (maximum noise) estimates, based upon comparisons with other mine/mill operations. Specific assumptions regarding the types, quantities, locations, and noise emission characteristics of major sources of noise are identified within the following text.

EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES

Mine/Mill Complex

Impacts

Whenever the distance from a project such as in the mine/mill complex is large compared to the distances between individual noise sources within the complex, then the mine/mill complex can be considered as a point source. The distances between the mine, mill, and associated waste disposal dumping areas are in the order of one mile, more or less. The nearest residences to the mine/mill complex are in the range of 10 to 15 miles. The sound power level of the equivalent point source is the sum of the power levels of all the sound sources that radiate in the direction of the postulated receiver, and the location of the point source is the acoustic center of the mine/mill complex.

Experience indicates that the environmental noise resulting from a typical large scale mine/mill operation is perceived, at a distance of several miles, as a relatively continuous, low level, low frequency noise occasionally punctuated by somewhat louder bursts of noise corresponding to rock blasting. During the period immediately preceding the blasting, there may be a noticable decrease in overall noise level due to cessation of mine activities in the vicinity of the blast area.

Table 3-1 lists the major sources of noise associated with the continuous operation of the mine/mill complex. Using these noise sources and conservative (maximum noise) assumptions regarding noise propagation results in noise levels from the mine/mill complex of

TABLE 3-1

MINE/MILL COMPLEX; MAJOR SOURCES OF NOISE

Source	Comments: Estimated Quantity in Operation; Locations	Noise Emission Characteristics*
Rock Drilling	(4)** blast hole drills, at mine center	98
Blasting	-	Refer to text
Loading	(6)** electric shovels	90
Misc. Diesel Powered Equipment	(8) dozers, loaders, etc., equally distributed, mine mill	87
Haul Trucks	(19) 120-ton end-dump trucks distributed between mine, mill and waste disposal areas	90
Primary Crusher; subsequent crushing, milling, roasting operations	mill facilities located west of mine	95

*Sound pressure level (dBA) re 2×10^{-5} N/M^2 at equivalent reference distance of 50 feet. Refer to Appendix B for discussion of emission data.

**Estimated quantity; detailed plans are not available at this date (November 1979).

equal to or less than existing ambient noise levels at distances of 5 to 10 miles. This "effects" distance is less for those directions for which the steepness of the terrain would act as a barrier for sound propagation (east, northeast, and southeast).

ERT has performed a limited set of airblast noise measurements and reviewed the results of other measurement programs. The results of these studies indicate that differences between sites, blasting methods, and propagation conditions result in significant variations in predicted sound levels or overpressure values. However, an indication of maximum magnitude of blast noise may be made using the scaling approach and data presented in a study by (Siskind and Summers 1974). Using the referenced approach and representative parameters of 1,400 pounds per delay (stemmed), a closest hole to evaluation point distance of two miles and a minimum shielding factor of 20 dB results in a maximum predicted overpressure of 3×10^{-4} psi and a linear scale impulsive sound level of 95 dB (relative to 20 N/m^2). A more reasonable interpretation of the empirical basis for the scaling approach would result in predicted blast noise values of at least an order of magnitude smaller than the values just cited (i.e., 3×10^{-5} psi or 75 dB).

There are no official blast noise standards for protecting a community from property damage, annoyance, and other impacts. However, the reference (Siskind and Summers 1974) does present a proposed interim set of sound level standards, summarized below:

	Linear-Peak	
	dB	Psi
Safe level	128	0.007
Caution range, measures may be applicable to reduce annoyance	128 to 136	0.007 to 0.018
Limit of allowable impulsive noise	136	0.018

The most conservative projection of Anaconda blast noise results in community sound levels more than several orders of magnitude below these proposed standards. On this basis, it is concluded that blasting at the site will produce little or no impact on sensitive land uses.

Based upon the relatively low levels of noise due to the mine/mill complex and the general lack of noise sensitive receptors within 5 to 10 miles distance (as noted under baseline conditions), environmental noise impacts of the mine/mill complex are not considered significant.

Recommended Mitigation Measures

Predicted community noise impacts due to the construction and operation of the mine/mill complex do not warrant special mitigation measures. However, federal noise regulations designed to protect worker health and safety will be considered in the purchase and operation of mine/mill complex equipment, for example (MSAHA 1969).

During blasting in the open pit, Anaconda will employ the annoyance-damage risk mitigation measures recommended the by Bureau of Mines; such measures include controlling the blast size and using audible pre-blast warning devices (Siskind and Summers 1974).

Unavoidable Adverse Impacts

There are no significant unavoidable adverse environmental noise impacts associated with the construction and operation of the proposed mine/mill complex.

Transmission Line

Impacts

Transmission line construction would be completed within a relatively brief time span (approximately 7 months) and require the following quantity of equipment potentially significant from a noise standpoint: one air compressor, a backhoe machine or auger truck, several boom/crane trucks (for tower erection), and a tensioner (conductor puller) truck. Noise levels from heavy duty diesel powered equipment of this category is typically in the 80 to 90 dBA range, at 50 feet reference distance (EPA 1971). At distances of one mile or more, the resulting maximum noise levels due to the construction of the transmission line are predicted to be less than 40 to 50 dBA. With background noise levels in the range of 15 to 45 dBA, the noise from construction of the line would be generally audible to an observer within distances of less than one mile.

The briefness of any potential exposure and lack of noise sensitive receptors in the vicinity of the transmission line construction suggest that noise impacts due to this operation will be insignificant.

Some noise emission will also occur due to activities associated with transmission line inspection and routine maintenance operations. The line will be flown several times per month, during daylight hours. The generally low attitude (1,500 feet or less) flights will produce a brief period of noise totaling several minutes in which the plane would be clearly audible to a receptor located within one mile or so on either side of the ROW. Peak noise levels, in the vicinity of the line, would be in the order of 70 to 80 dBA depending on the specific type of aircraft and altitude flown (FAA 1977).

Maintenance operations are expected to consist of the replacement of insulators and similar level repairs. Noise sources associated with maintenance will include pickup light-duty trucks (approximately 70 dBA at 50 feet distance for 50 to 55 mph speeds, down to 62 dBA at 30 mph) and bucket cranes operations (estimated to be 75 to 78 dBA at 50 feet distance (CERL 1978).

Under certain conditions, transmission lines are capable of producing audible noise. Factors associated with this source of noise are voltage gradient and moisture (Taylor 1969). The results of extensive studies by utilities and by federal agencies (Department of Energy and National Bureau of Standards) indicate that, for transmission lines in the above 500-Kv class, conductor moisture in the form of frost, fog, or rain results in a particularly annoying source of noise in the immediate vicinity of the line corridor (Molina 1979). Because the proposed action involves a much lower voltage line (230 Kv) which traverses a generally arid region, the possibility of audible noise generation is considered very unlikely.

Noise impacts associated with the construction and operation of the proposed 230 Kv transmission line will not be significant due to the types of noise sources and remoteness of the line from noise sensitive receptors.

Recommended Mitigation Measures

Predicted community noise impacts due to the construction and operation of the 230 Kv transmission line do not warrant special mitigation measures.

Unavoidable Adverse Impacts

There are no significant unavoidable adverse environmental noise impacts associated with the construction and operation of the proposed 230 Kv transmission line.

Alternative 1, West Smoky Valley Alternative

Same as above.

Alternative 2, Alternative Tower Structures

Same as above.

Alternative 3, Alternative Crushing/Grinding Circuit for Mine/Mill Complex

Same as above.

Alternative 4, No Action

Impacts

The No Action alternative assumes Anaconda could develop on-site generation facilities. Therefore the noise impacts associated with this alternative would be identical to those described for the proposed action. Based upon measurements of similar units, it is estimated that the noise level 50 feet from a single unit would be a maximum of 80 decibels A-weighted (dBA), and at a distance of 1,000 feet from all six units the total noise level would be approximately 60 dBA. These levels and the presence of other generally noisier mill area activities noted in the discussion of impacts for the proposed action, plus the remotenexx of the mill from noise sensitive receptors, result in no significant increases in noise levels associated with this alternative.

Unavoidable Adverse Impacts

There would be additional noise sources as a result of operation of the generator. However, the noise levels from the generator would range from 60 to 80 dBA and are not considered significant in comparison with other noise levels associated with the mine/mill complex, especially considering the remoteness of the mill from sensitive noise receptors.

RELATIONSHIP BETWEEN LOCAL SHORT-TERM USE OF THE ENVIRONMENT AND THE ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The only potential long-term impact phenomena associated with noise is loss of hearing. Noise levels outside of project boundaries will be of magnitudes well below established damage-risk criterion (MSAHA 1969).

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Project noise emissions will have no significant bearings on resource commitments.

SUMMARY

The impact due to a new project is usually evaluated by determining the extent that applicable standards are exceeded or if the relative change in community noise levels is excessive. In the case of the areas in the vicinity of proposed project, there are no legal noise standards in existence.

In regard to the criteria of significant changes in ambient noise levels, it is conceivable that a very small number of people may consider the increase in background noise level at the areas noted and at certain times, to constitute an annoyance. However, in terms of substantive criteria, such as speech or sleep interference, the project will produce no significant impacts.

CHAPTER 4

LIST OF PREPARERS

INTRODUCTION

The following idividual had primary responsibility for conducting the technical report. His education, project responsibilities, qualifications, and experience are summarized below.

ENVIRONMENTAL RESEARCH & TECHNOLOGY, INC.

Robert M. Earsy, Noise Engineer

B.S. in Electrical Engineering, University of Connecticut;
M.S. in Electrical Engineering, Northeastern University;
M.C.P. in City Planning, Harvard University;
Registered professional engineer, Massachusetts.

Anaconda Nevada Molybdenum Project: Responsible for environmental study of noise. Author of Noise Technical Report.

Experience includes design and supervision of noise measurement, prediction, and abatement studies. Has participated as an expert witness in public hearings related to environmental acoustics.

CHAPTER 5

CONSULTATION AND COORDINATION

No additional consultation and coordination was required for the Noise Technical Report, beyond that provided by internal (ERT) project management.

APPENDIX A

METHODOLOGY

Noise impact assessment involves three basic steps. The first step is to determine baseline noise levels at points in the community where people (and wildlife) could potentially be adversely affected (referred to as noise-sensitive receptors).

The second step is to predict noise levels at these noise-sensitive receptors caused by the project during its various stages of development. The third and final step is to evaluate the significance of the absolute and incremental change in noise levels from the project.

Noise impact is judged according to two criteria: (1) the extent that specific, quantitative government laws or regulations are exceeded, and (2) the estimated extent that people or wildlife will be actually adversely affected.

APPENDIX B

NOISE SOURCES

The following sources of noise are considered to be the major determinants of project (mine/mill complex) operational phase noise at distances of several miles or more.

ROCK DRILLING (BLAST HOLE DRILLS)

The overall noise emission level for a single rock drill is 98 dBA at 50 feet reference distance (EPA 1971b, page 26, Table IV). The octave band sound pressure levels for the rock drill (shown in Table B-1) were based upon an interpretation of Figure A-7 of the reference.

ELECTRIC SHOVELS

Details concerning the type and size of power shovels was not available for this analysis. In lieu of such data, it was conservatively assumed that the power shovel noise emission would be identical to that of a large diesel-electric haulage truck.

MISCELLANEOUS DIESEL EQUIPMENT

A variety of diesel powered equipment is required at any major mine/mill operation. An assortment of dozers, front end loaders, scrapers, and other equipment was assumed. Each piece of equipment was assigned a noise eission at 50 feet of 87 dBA, a conservative value obtained from an interpretation of measured data for such equipment (CERL 1978).

HAUL TRUCKS

ERT has conducted noise measurements of large off-road diesel-electric haul trucks at mining operations in New Mexico and Montana. For 100 to 170 ton vehicles on up upgrade, noise levels (referenced to 50 feet) ranged from 88 to 90 dBA. On a downgrade, levels ranged 10 to 20 dBA lower. For the 120-ton haul trucks planned for this project, 90 dBA was used as a conservative (upper limit) noise emission value.

MILL

ERT has conducted noise measurements at several large rock mill complexes (at distances of several thousands of feet and remote from other noise sources). Free field (unobstructed line-of-sight) data from such tests is presented in Table B-1.

TABLE B-1

OCTAVE BAND SOUND PRESSURE LEVEL (dB) SPECTRA OF THE MAJOR PROJECT NOISE SOURCES*

Noise Source	Octave Band Center Frequency (Hz) 31.5	63	125	250	500	1000	2000	4000	8000	A-wt
Haulage Trucks	78	85	84	93	90	84	77	72	60	90
Electric Shovel	78	85	84	93	90	84	77	72	60	90
Dozers, Loaders, and Scrapers	77	87	89	84	84	83	81	77	76	87
Blast Hole Drills	90	103	101	95	95	94	92	88	87	98
Mill: Primary, Secondary, and Tertiary Crushers, etc.	108	105	100	94	91	88	86	84	83	95

*Based upon a reference distance of 50 feet.

GLOSSARY

A-weighted Sound Level. A number, expressed in decibels, followed by an identifier dBA. To describe noise environments and to assess impact on noise-sensitive areas, a frequency weighting measure that stimulated the human perceptions is customarily selected. A-weighted ratings of noise sources, which reflect the human ear's reduced sensitivity to low frequencies, have been found to correlate well with human perceptions of the annoying aspects of noise, particularly with traffic noise sources. Consequently, A-weighted noise levels, described in decibels-A or dBA, are the values cited by such federal agencies as the Federal Highway Administration (FHWA) in its noise criteria and in a majority of state and municipal noise ordinances (National Institute of Municipal Law Enforcement Officers and Environmental Protection Agency 1975).

Ambient Noise. The totality of noise is a given place and time.

Background Noise Level. Noise from all sources other than a particular sound of interest (e.g., other than mining noise if mining noise was being measured).

Noise. Unwanted sound.

Noise Level Descriptors. Both the fluctuation of the noise level and the maximum noise levels are important in assessing potential noise impact. Noise fluctuation may be described by determining those levels exceeded a certain percentage of the time. For a specified time period, the L_{90} or the noise level exceeded 90% of the time) is generally considered as background. The L_{50} level represents the median noise levels. The L_{10} (or the level exceeded 10% of the time) is generally indicative of the higher noise levels occurring over the given time period.

The U.S. Environmental Protection Agency (EPA 1974) and other groups advocate use of an average A-weighted sound level of Equivalent Sound Level over a given time interval as the best descriptor of environmental noise. $L_{eq}(24)$ is the 24-hour day Equivalent Sound Level and represents the equivalent steady noise level over a 24-hour period of time which would contain the same noise energy as the actual time-varying noise during the same period. The day-night sound level (L_{dn}) is defined in a manner similar to $L_{eq}(24)$, but with a 10 decibel weighting applied to the equivalent sound level during the nighttime hours of 10:00 P.M. to 7:00 A.M.

REFERENCES

Taylor 1969. Taylor, Edgar R., Vernon L. Chartier, and Donald N. Rice, "Audible Noise and Visual Corona from HV and EHV Transmission Lines and Substation Conductors - Laboratory Tests." IEEE Transactions on Power Apparatus and Systems, Vol-PAS 88, No. 5, May 1969.

Molina 1979. Molino, Dr. John, Personal Communication, November 5, 1979.

FAA 1977. Federal Aviation Administration, "Advisory Circular 36-1B Certified Airplane Noise Levels," Appendix III, Propeller Driven Small Airplanes, December 5, 1977.

Stevens, Rosenblith, Bolt 1955. Stevens, K. N., W. A. Rosenblith, and R. H. Bolt. "A Community's Reaction to Noise: Can It Be Forecast?" Noise Control, 1 (January 1955).

EPA 1974. U.S. Environmental Protection Agency. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Document 550/9-74-004 (March 1974).

EPA 1971a. U.S. Environmental Protecton Agency. "Community Noise," Report No. NTID 300.3, Wyle Laboratories.

EPA 1971b. U.S. Environmental Protection Agency. Noise from Construction Equipment and Operations, Building Equipment, and Home Applicances. NTID 300.1.

CERL 1978. Construction Engineering Research Laboratory. Construction-Site Noise Control Cost-Benefit Estimating Procedures. Interim Report N-36.

Siskind and Summers 1974. Siskind, D. E., and C. R. Summers, "Blasting Noise Standards and Instrumentation," Bureau of Mines Environmental Research Program, Technical Progress Report 78.

MSAHA 1969. Mine Safety and Health Administration Noise Standard for Metal and Nonmetallic Open Pit Mines. Code of Federal Regulations, Title 30, Chapter I, exerpt of Part 55 pertaining to noise, 34 FR 12504, July 31, 1969 and subsequent amendments.

National Institute of Municipal Law Enforcement Officers and the Environmental Protection Agency, Office of Noise Abatement Control, Model Community Noise Control Ordinance, 1975.

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